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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,257	12/02/2003	Francis M. Aguirre	59432US002	3530
32692	7590	05/17/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			QUASH, ANTHONY G	
PO BOX 33427			ART UNIT	
ST. PAUL, MN 55133-3427			PAPER NUMBER	
			2881	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/726,257

Applicant(s)

AGUIRRE ET AL.

Examiner

Anthony Quash

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/2/03 (application).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 601/04-4/4/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Specification

In the applicants' specification under the Related Application part applicant has disclosed several applications, which the applicants have indicated that are co-owned by the applicants/assignee. However, the applicants have only listed the Attorney docket numbers. This is not sufficient. Applicants' are advised that are to enter the actual application numbers and/or patent numbers to which these Attorney docket numbers refer. In addition, if applicant wishes to claim priority to any of the applications mentioned in this section, then applicants should resubmit the oath/declaration with the applications listed to which they are claiming priority. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim. The claim states, "The radiation curing apparatus according to claim 9," This makes the claim unclear. Appropriate correction is required.

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Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6,8,11,13 are rejected under 35 U.S.C. 102(b) as being anticipated by Hed [5,301,090]. As per claim 1, Hed [5,301,090] discloses a plurality of solid state radiation sources (LEDs figs. 1-3,5,7) to generate radiation, a plurality of optical concentrators (col. 9 lines 1-10, elements 74,75,76), wherein each concentrator receives radiation from a corresponding one of the solid state radiation sources, a plurality of optical waveguides (abstract, figs. 1-3,5,7, elements 77,78,73) wherein each of the plurality of optical waveguides includes a first end and a second end, wherein each first end receives concentrated radiation from a corresponding concentrator, and a support structure (col. 4 lines 64-68, col. 7 lines 1-25, 58-68, col. 11 lines 55-65 elements 80,82) to stabilize the plurality of optical waveguides between the first and second ends. Also see Hed [5,301,090] abstract, figs. 1-3,5,7, col. 1 lines 65-68, col. 2 lines 1-5,45-55,65-68, col. 3 lines 15-28,48-58, col. 4 lines 1-10,64-69, col. 5 lines 5-40, 65-69, col. 5 lines 1-25, column 7, col. 8 lines 10-20,35-45, col. 9 lines 1-15,50-55,65-68, col. 10 lines 1-25, 60-68, column 11, col. 12 lines 65-68, and col. 13 lines 60-68.

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As per claim 2, Hed [5,301,090] discloses the plurality of solid state radiation sources comprising a plurality of LED dies (red, green, blue LEDs, col. 11 line 7).

As per claim 3, Hed [5,301,090] discloses an interconnect circuit layer to provide electrical connection to the plurality of LED dies, a heat exchange unit, and the interconnect circuit layer being thermally coupled to the heat exchange unit. See Hed [5,301,090] (fig. 3, col. 9 line 65 – col. 10 line 15).

As per claim 4, Hed [5,301,090] discloses the plurality of waveguides comprising a plurality of optical fibers. See Hed [5,301,090] col. 11 line 13.

As per claim 5, Hed [5,301,090] discloses a fiber array connector to support the first ends of the plurality of fibers in a defined pattern. See Hed [5,301,090] figs. 2-3,5.

As per claim 6, Hed [5,301,090] discloses the support comprising a housing that encloses at least a portion of the plurality of optical fibers. See Hed [5,301,090] abstract, col. 3 lines 15-35, col. 5 lines 5-15.

As per claim 8, Hed [5,301,090] discloses a banding to surround and secure at least the first portion of the second ends of the fibers. See Hed [5,301,090] figs. 2,5,7, col. 7 lines 1-35,58-68, col. 11 lines 55-66.

As per claim 11, Hed [5,301,090] discloses an optical element to collect (CPC) and distribute optical radiation from the optical waveguide second ends in a selected light distribution pattern. See Hed [5,301,090] fig. 5, col. 4 lines 4-10, col. 11 line 55 - col. 12 line 10.

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As per claim 13, Hed [5,301,090] discloses the second ends of the fibers being bundled. See Hed [5,301,090] col. 11 lines 5-40, 55-65, col. 13 lines 60 – col. 14 line 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hed [5,301,090]. As per claim 7, Hed [5,301,090] discloses a heat exchange unit (fig. 3, col. 9 line 65 – col. 10 line 15). However, it does not explicitly state the heat exchange unit being disposed in a direction opposite to the emitted radiation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the heat exchange unit be disposed in a direction opposite to the emitted radiation, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claim 14, Hed [5,301,090] teaches an interconnect circuit (figs. 2-2b, col. 7 lines 25-35) layer to provide electrical connection to the plurality of LED dies, wherein the plurality of LED dies is arranged in a first grouping and a second grouping, wherein the first grouping of LED dies is connected to a first portion of the interconnect circuit layer and the second grouping of LED dies is

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connected to a second portion of the interconnect circuit layer. See Hed [5,301,090] col. 4 lines 1-10.

As per claims 15-16, Hed [5,301,090] teaches a first output intensity of at least one LED die of the first grouping of LED dies is controllable separate from a second output intensity of at least one LED die of the second grouping of the LED dies and the material receiving radiation when one of the groupings of LED dies is not activated. See Hed [5,301,090] abstract, figs. 1-3,5,7, col. 1 lines 65-68, col. 2 lines 1-5,45-55,65-68, col. 3 lines 15-28,48-58, col. 4 lines 1-10,64-69, col. 5 lines 5-40, 65-69, col. 5 lines 1-25, column 7, col. 8 lines 10-20,35-45, col. 9 lines 1-15,50-55,65-68, col. 10 lines 1-25, 60-68, column 11, col. 12 lines 65-68, and col. 13 lines 60-68.

As per claim 17, Hed [5,301,090] teaches all aspects of the claim except for explicitly stating that the plurality of LED dies irradiate UV radiation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the plurality of LED dies irradiate UV radiation, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim 18, Hed [5,301,090] teaches the second ends of the fibers being patterned to uniformly irradiate the first material. See Hed [5,301,090] figs. 1-3,5,7.

Claims 1,10,12,17,19-26, 29-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Decaudin [6,692,250] in view of Hed [5,301,090]. As

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per claims 1,19,31,34 Decaudin [6,692,250] teaches a solid state radiation source comprising a plurality of LED dies to generate radiation that cures a first material, a plurality of optical concentrators (abstract, col. 4 lines 1-30, element 23'), a plurality of optical waveguides (optical fibers), wherein each of the plurality of optical waveguides includes a first and second end, and wherein the first end receives concentrated radiation from the a corresponding concentrator. See Decaudin [6,692,250] abstract, figs. 1-2b, 4, col. 3 line 55 – col. 4 line 48, col. 5 lines 1-35,45-55, 65 – col. 6 line 30, 64 - col. 7 line 5, 20-35. However, Decaudin [6,692,250] does not explicitly state a support structure to stabilize the plurality of optical waveguides between the first and second ends. Hed [5,301,090] does teach a support structure to stabilize the plurality of optical waveguides between the first and second ends. See Hed [5,301,090] (col. 4 lines 64-68, col. 7 lines 1-25, 58-68, col. 11 lines 55-65 elements 80,82). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a support structure to stabilize the plurality of optical waveguides between the first and second ends in order to prevent damage to the optical fibers by outside forces and aid in supporting the fibers thereby preventing the dislodging of the fibers from there LED. However, neither Decaudin [6,692,250] nor Hed [5,301,090] explicitly state a substrate to support the radiation-curable chemical formulation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a substrate (stage, table, etc) to support the radiation-curable chemical formulation in order to allow one to uniformly cure/irradiate the material since it was well

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known in the art to provide a supporting structure to allow one to irradiate a material on a surface.

As per claim 10, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claim except for explicitly stating the device comprising first and second alignment pins wherein the interconnect circuit layer includes the alignment holes to receive the alignment pins. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have first and second alignment pins wherein the interconnect circuit layer includes the alignment holes to receive the alignment pins in order to aid in providing proper alignment of the optical fibers with the LED sources.

As per claims 12, 37, Decaudin [6,692,250] teaches the solid state radiation sources emitting a high intensity irradiance profile that cures the first material in cross-machine and machine direction. See Decaudin [6,692,250] col. 5 lines 5-40.

As per claim 17, Decaudin [6,692,250] teaches at least a portion of the plurality of LED dies comprise ultraviolet (UV) emitting LED dies. See Decaudin [6,692,250] col. 5 lines 20-35.

As per claims 20-21,32, Decaudin [6,692,250] teaches the controller coupled to the solid state light source, to selectively activate one or more groups of the plurality of dies, and the controller being adapted to selectively activate a first group of LED dies to emit radiation corresponding to a first absorption band of a first radiation-curable chemical formulation. See Decaudin [6,692,250] col. 3 lines 1-5, 55 – col. 4 line 15, col. 5 lines 1-35.

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As per claims 22,33, Decaudin [6,692,250] teaches the controller being adapted to selectively activate a second group of LED dies to emit radiation corresponding to a second absorption band of a second radiation-curable formulation. See Decaudin [6,692,250] col. 3 lines 1-5, 55 – col. 4 line 15, col. 5 lines 1-35.

As per claim 23, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claim except for explicitly stating a heat exchange unit coupled to the solid state light source that is disposed opposite a direction of output radiation. Hed [5,301,090] does teach a heat exchange unit (fig. 3, col. 9 line 65 – col. 10 line 15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the heat exchange unit be disposed in a direction opposite to the emitted radiation, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claim 24,35 Decaudin [6,692,250] teaches the controller selectively activates a first LED die group in response to a trigger signal. See Decaudin [6,692,250] col. 3 lines 1-5, 55 – col. 4 line 15, col. 5 lines 1-35. Also see Hed [5,301,090] col. 4 lines 4-10, col. 5 lines 5-15 and col. 8 lines 28-40.

As per claim 25, Hed [5,301,090] teaches the controller sends an increase drive current to a first LED die channel to compensate for a reduced emission output from a second LED die channel. See Hed [5,301,090] col. 6 lines 45-55, col. 8 lines 25-40. Also see Decaudin [6,692,250] col. 3 lines 1-10, 60-68, col. 5 lines 1-25.

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As per claims 26,36, Hed [5,301,090] teaches the plurality of fibers output a selected steerable illumination pattern. See Hed [5,301,090] abstract, figs. 1-3,5,7, col. 1 lines 65-68, col. 2 lines 1-5,45-55,65-68, col. 3 lines 15-28,48-58, col. 4 lines 1-10,64-69, col. 5 lines 5-40, 65-69, col. 5 lines 1-25, column 7, col. 8 lines 10-20,35-45, col. 9 lines 1-15,50-55,65-68, col. 10 lines 1-25, 60-68, column 11, col. 12 lines 65-68, and col. 13 lines 60-68. Also see Decaudin [6,692,250] col. 3 lines 1-10, 60-68, col, 5 lines 1-25.

As per claim 29, Hed [5,301,090] teaches a collecting lens interposed at a selected distance between the second ends of the fibers and where the radiation-curable substrate would be located. See Hed [5,301,090] teaches col. 12 line 60 – col. 13 line 15.

As per claim 30, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claim except for explicitly stating that the radiation curable chemical formulation being disposed on a non-uniform structure and wherein the second ends of the fibers are patterned to uniformly irradiate the radiation curable chemical formulation. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the radiation curable chemical formulation being disposed on a non-uniform structure and wherein the second ends of the fibers are patterned to uniformly irradiate the radiation curable chemical formulation in order to brighten and harden teeth, since it was well known in the art to irradiate a resin (located on one's teeth) responsive to uv radiation in order to harden and brighten them.

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Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Decaudin [6,692,250] in view of Hed [5,301,090] as applied to claim 19 above, and further in view of Bi [2003/0117691]. With respect to claims 27-28, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claims except for explicitly stating the substrate being disposed on a movable platform and the substrate being suspended between movable rollers. Bi [2003/0117691] does teach the substrate being disposed on a movable platform and the substrate being suspended between movable rollers. See Bi [2003/0117691] abstract, paragraphs [0014, 0024, 0097, 0145-0146, 0152]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the substrate be disposed on a movable platform and the substrate be suspended between movable rollers in order to aid in conveying the substrate and chemical formulation material to the exact position to be irradiated by the beam

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. and 6,556,734 to Bischel et al. is considered pertinent to the applicants' disclosure. Bischel [6,556,734] is considered pertinent due to its discussion on an electrical connection scheme for optical devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is

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(571)-272-2480. The examiner can normally be reached on Monday thru Friday
9 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the
examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax
phone number for the organization where this application or proceeding is
assigned is 703-872-9306.

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free).

A. Quash

A.Q.
5/10/05

Nikita Wells

NIKITA WELLS
PRIMARY EXAMINER

05/12/05